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## Test 949: Massey-Ferguson MF 130 (Diesel)

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# NEBRASKA TRACTOR TEST 949 - MASSEY-FERGUSON MF 130 DIESEL

## POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of Mercury
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
26.96	2250	1.918	0.496	14.06	206	59	75	29.040
Standard Power Take-off Speed (540 rpm)—One Hour								
23.79	1889	1.654	0.484	14.38	208	59	75	29.070
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
24.09	2367	1.736	0.502	13.88	199	60	76	.....
0.00	2466	0.663	.....	.....	158	61	77	.....
12.36	2425	1.167	0.658	10.59	175	59	75	.....
26.89	2252	1.930	0.500	13.93	209	60	76	.....
6.23	2448	0.905	1.011	6.88	163	60	76	.....
18.29	2395	1.426	0.543	12.83	184	60	75	.....
Av	14.64	2392	1.305	0.621	11.22	181	75	29.073

## DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Fuel Consumption			Temp Degrees F					Barom- eter inches of Mercury
				Slip of drivers %	Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool- ing med	Air wet bulb	Air dry bulb		
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST												
Maximum Available Power—Two Hours—5th Gear												
22.82	1625	5.27	2251	5.66	1.878	0.573	12.15	201	48	61	28.875	
75% of Pull at Maximum Power—Ten Hours—5th Gear												
18.70	1246	5.63	2376	4.46	1.689	0.629	11.07	184	45	46	28.890	
50% of Pull at Maximum Power—Two Hours—5th Gear												
14.54	942	5.79	2411	3.22	1.408	0.674	10.33	183	43	58	29.030	
MAXIMUM POWER WITH BALLAST												
21.39	3447	2.33	2270	14.83	3rd Gear .....		180	46	54	28.880		
22.28	2337	3.58	2252	8.23	4th Gear .....		193	48	61	28.950		
23.06	1641	5.27	2251	5.55	5th Gear .....		192	48	61	28.950		
22.71	1193	7.14	2254	4.01	6th Gear .....		194	48	61	28.950		
20.29	683	11.14	2247	2.30	7th Gear .....		190	48	61	28.950		
MAXIMUM POWER WITHOUT BALLAST												
23.05	1655	5.22	2253	7.50	5th Gear .....		209	54	67	28.700		

## VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear

Pounds pull	1641	1705	1788	1868	1937	1831
Horsepower	23.06	21.55	20.02	18.24	16.12	12.74
Crankshaft speed, rpm	2251	2028	1804	1578	1348	1124
Miles per hour	5.27	4.74	4.20	3.66	3.12	2.61
Slip of drivers, %	5.55	5.88	6.20	6.52	6.73	6.41

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 12.4-28; 4; 12	Two 12.4-28; 4; 12
	—Liquid	335 lb each	None
	Cast iron	270 lb each	None
Front tires	—No, size, ply & psi	Two 5.50-16; 4; 24	Two 5.50-16; 4; 20
	—Liquid	None	None
	Cast iron	130 lb each	None
Height of drawbar		22 inches	23 inches
Static weight with operator—Rear		3240 lb	2030 lb
	Front	1440 lb	1180 lb
	Total	4680 lb	3210 lb

## Department of Agricultural Engineering

Dates of Test: OCTOBER 7 to OCTOBER 21, 1966

Manufacturer: MASSEY-FERGUSON INCORPORATED, DETROIT, MICHIGAN

**FUEL, OIL and TIME** Fuel No 2 diesel Cetane No 57.0 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8363 Weight per gallon 6.964 lb Oil SAE 20-20W API service classification MS, DM To motor 1.436 gal Drained from motor 1.289 gal Transmission and final-drive lubricant SAE 10W-30 Total time engine was operated 42½ hours.

**ENGINE** Make Perkins Diesel Type 4 cylinder vertical Serial No 7931037 Crankshaft mounted lengthwise Rated rpm 2250 Bore and stroke 3¼" x 3½" Compression ratio 22.5 to 1 Displacement 107 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh Oil filter replaceable paper cartridge Oil cooler radiator for transmission and hydraulic oil Fuel filter screen in sediment bowl and replaceable paper cartridge Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type standard Serial No 370524 Tread width rear 48" to 76" front 48" to 72" Wheel base 72" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 25.7" Vertical distance above roadway 25.0" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system constant running except when pto foot clutch is disengaged Transmission selective gear fixed ratio partial range synchro-mesh Advertised speeds mph first 1.3 second 1.7 third 2.6 fourth 3.8 fifth 5.4 sixth 7.2 seventh 11.1 eighth 16.0 reverse 1.5 and 6.2 Clutch dual dry disc for transmission and PTO operated by single foot pedal Brakes Vee type shoes operated by two foot pedals which can be locked together Steering no power assist Turning radius (on concrete surface with brake applied) right 108" left 108" (on concrete surface without brake) right 127" left 127" Turning space diameter (on concrete surface with brake applied) right 226" left 226" (on concrete surface without brake) right 264" left 264" Belt pulley 1040 rpm at 2000 engine rpm diam 11¾" face 6½" Belt speed 3097 fpm Power take-off 540 rpm at 1890 engine rpm.

**REPAIRS and ADJUSTMENTS** During limber-up run a wire became disconnected at the voltage regulator. A connector was replaced and test continued.

**REMARKS** All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First and second gears were not run as it was necessary to limit the pull in third gear to avoid excessive wheel slippage. Eighth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 949.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station  
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

# EXPLANATION OF TEST REPORT

## GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

## PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

## BELT OR POWER TAKE-OFF PERFORMANCE

**Maximum Power and Fuel Consumption.** The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

**Varying Power and Fuel Consumption.** Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque,  $\frac{1}{2}$  of the 85% torque; maximum power,  $\frac{1}{4}$  and  $\frac{3}{4}$  of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

## DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

**Varying Power and Fuel Consumption With Ballast.** The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic trans-

mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

**Maximum Power with Ballast.** Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

**Maximum Power Without Ballast.** All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

**Varying Power and Travel Speed with Ballast.** Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



Massey-Ferguson MF 130 Diesel